

DRAWINGS

Please replace the drawings with the attached replacement drawings. Figures 1, 2, and 3 have been revised.

REMARKS

In the Official Action, the Examiner rejected pending claims 1-43. Claims 1, 5, 7, 15, 16, 20, and 36 have been amended. Further, claims 4, 19, 23, and 42 have been cancelled. Finally, new claims 44-47 have been added. No new matter has been added. Applicants respectfully request reconsideration of the pending claims in view of the foregoing amendments and the following remarks.

Objections to the Drawings

The Examiner objected to the drawings because of errors with reference numerals in the drawings. For example, certain reference numerals depicted in the figures were not mentioned in the written description, and certain reference numerals mentioned in the written description were not depicted in the figures. Accordingly, Applicants have amended the drawings and the specification to correct the errors. Therefore, Applicants respectfully request withdrawal of the objections to the drawings that were based on these errors.

The Examiner also objected to the drawings based on the incorrect assessment that the drawings do not show every feature of the claims. In particular, the Examiner asserted erroneously that the figures do not show "the transfer of a portion of liquid hydrocarbon from the fractionation zone to a catalyst preparation zone," as recited in the claims. Applicants respectfully refer the Examiner to Figure 1 which depicts a bottom discharge of olefin-free isobutane from the fractionation column 34 through surge tank 36 and line 37 to the catalyst feed tank 12. *See* Specification, paragraphs 0043 and 0055; *see also* Figure 2.

In view of the corrections to the written description and the drawings, as well as the foregoing remarks, Applicants respectfully request that the Examiner withdraw the objections to the drawings.

Rejections Under 35 U.S.C. § 112, Second Paragraph

The Examiner rejected claims 20-22 under 35 U.S.C. § 112, second paragraph, as being indefinite. In response, Applicants corrected a typographical error in claim 20 to address the Section 112 rejection without altering the scope of the original claims. Accordingly, Applicants respectfully request withdrawal of the present rejection of claims 20-22 under 35 U.S.C. § 112, second paragraph.

Rejections Under 35 U.S.C. § 103

As a preliminary matter, Applicants note that the claim numbers rejected are not legible in the Examiner's initial sentence of each Section 103 rejection. As a result, Applicants have approximated which claims were rejected under the various Section 103 rejections, and. Applicants respectfully request clarification of what claims were rejected under each Section 103 rejection.

The Examiner apparently rejected claims 25-27, 29, 31-39, and 41-43 under 35 U.S.C. § 103, as being unpatentable over Kreischer et al. U.S.P.N. 6,045,661 and Howard et al. U.S.P.N. 5,553,437. In addition, the Examiner appears to have rejected dependent claims 28 and 40 under 35 U.S.C. § 103 as being unpatentable over Kreischer et al. and Howard et al., and further in view of Lutz U.S.P.N. 4,284,837. Finally, the Examiner apparently rejected the remaining

pending claims, including independent claims 1 and 15, under 35 U.S.C. § 103 as being unpatentable over Kreischer et al., Howard, and Perry U.S.P.N. 3,869,807. Claims 1, 15, 25, and 36 are independent. Applicants respectfully traverse these rejections.

The burden of establishing a *prima facie* case of obviousness falls on the Examiner. *Ex parte Wolters and Kuypers*, 214 U.S.P.Q. 735 (PTO Bd. App. 1979). Obviousness cannot be established by combining or modifying the teachings of the prior art to produce the claimed invention absent some teaching or suggestion supporting the combination or modification. *See ACS Hospital Systems, Inc. v. Montefiore Hospital*, 732 F.2d 1572, 1577, 221 U.S.P.Q. 929, 933 (Fed. Cir. 1984). Accordingly, to establish a *prima facie* case, the Examiner must not only show that the combination includes *all* of the claimed elements, but also a convincing line of reason as to why one of ordinary skill in the art would have found the claimed invention to have been obvious in light of the teachings of the references. *Ex parte Clapp*, 227 U.S.P.Q. 972 (B.P.A.I. 1985).

The present techniques provide for discharging a hydrocarbon fluid in a polymer slurry exiting a reaction zone or reactor, and then vaporizing and/or flashing hydrocarbon fluid in an intermediate pressure zone or chamber. The resulting hydrocarbon vapor is *condensed* and recycled *without fractionation* to the reactor or reaction zone. In sharp contrast, none of the three cited references relied on by the Examiner in rejecting the present independent claims teach, suggest, or disclose these features. *See, e.g.*, Kreischer, Figure; col. 3, lines 5-67; col. 4, lines 1-16 (disclosing no condensation of the flashed hydrocarbon effluent and no direct recycle of the hydrocarbon without fractionation). Indeed, in Kreischer, for example, *all* of the hydrocarbon recovered from the reactor effluent is sent through a fractionation system. *See* Kreischer, Figure;

col. 3, lines 5-67. No hydrocarbon bypasses the fractionation system, as claimed. See Kreischer, Figure; col. 4, lines 1-16. Another direct conflict of Kreischer with the present claims is that the flashed effluent hydrocarbon from the in Kreischer is not *condensed*, as claimed. See Kreischer, Figure; col. 3, lines 5-67. As for the Perry reference, it describes that reactor effluent is flashed in a flash tank 1, but discloses no condensation of the flash gas or recycle of a condensed liquid. See, e.g., Perry, Figure; col. 2, lines 43-66. Finally, in the Howard system, the hydrocarbon condensed is *not* recycled to the reactor but instead is flashed to provide refrigeration for the Howard condenser. See Figures 1-2; col. 5, lines 17-39 (disclosing no recycle of liquid to the reactor 103). For these reasons, Applicants stress that the three references combined by the Examiner to reject the independent claims clearly fail to disclose all of the recited features of the independent claims.

Independent Claims

A. The References Do Not Disclose Condensation of Vaporized Reactor Effluent

Independent claims 1 and 25 recite “*condensing* the vaporized hydrocarbon fluid stream.” Similarly, independent claim 15 recites “a *condenser* fluidically connected to the gas outlet of the intermediate pressure chamber and adapted to condense the vaporized hydrocarbon fluid.” Independent claim 36, as amended, recites a “*condenser* adapted to condense the vaporized hydrocarbon fluid.” In sharp contrast, the Kreischer, Howard, and Perry in the cited combinations used to reject the independent claims are absolutely devoid of a process for condensing hydrocarbon flashed from a slurry withdrawn from a polymerization reactor, as claimed.

In rejecting the independent claims, the Examiner relied on the Kreischer reference to disclose condensation of vaporized hydrocarbon from the reactor slurry discharge. However, in the Kreischer system, the flashed vapor from the reactor effluent is recovered *without* subsequent condensation. *See* col. 3, lines 23 - col. 4, line 15. Indeed, as depicted in the Kreischer figure, the hydrocarbon liquid in the reactor effluent is vaporized, and the resulting vapor is sent to the downstream fractionation system *without any intervening condensation* of the vaporized hydrocarbon, as claimed. *See* Figure: col. 3, lines 22-42; col. 63-67; col. 4, lines 4-16. To support the rejection, the Examiner pointed erroneously to cooler 58 of the Kreischer system. However, cooler 58 does *not* condense the entering vapor stream. Col. 4, lines 4-15. Indeed, any liquid condensate exiting the cooler 58 would damage the downstream compressor 62. *See* col. 4-15; Figure. To the contrary, the cooler 58 only cools the vapor stream in an effort to improve the operation of the downstream compressor 62. *See* col. 4-15 (explaining that cooling the vapor reduces the power required for compression).

As for the other references (Howard et al., and Perry) in the cited combination, they do nothing to obviate the deficiencies of the Kreischer reference discussed above. To be sure, these secondary references fail to disclose a process for condensing hydrocarbon flashed from a slurry withdrawn from a polymerization reactor. For instance, the Perry system is absolutely devoid of condensing vaporized or flashed hydrocarbon from the reactor effluent. *See* col. 2, lines 43-64; Figure. Instead, the Perry reference discloses that the overhead vapor 11 from the flash tank 7 which receives the reactor effluent via line 10 is sent to a propylene recovery system with *no* condensation of the vapor 11. *See* Figure; col. 2, line 43 - col. 3, line 4. Similarly, the Howard system discloses no condensation of vaporized reactor effluent. *See* col. 5, lines 17-40; Figures 1

and 2. This is not surprising because the Howard polyalkene process utilizes a *gas*-phase reactor 103. Indeed, a gas phase reactor does not utilize liquid feed and thus there is no need to condense the spent hydrocarbon vapor exiting the reactor 103 for recycle to the reactor 103. *See* col. 5, lines 17-40; Figures 1 and 2.

Accordingly, the three cited references, taken alone or in combination, fail to teach, suggest, or disclose *all* of the features of the independent claims. Moreover, there is no suggestion or motivation to modify or combine the cited references in the manner asserted by the Examiner or in the manner recited in the claims. Thus, the Examiner has failed to establish a *prima facie* case of obviousness. Therefore, the independent claims 1, 15, 25, and 36, and their dependent claims, are believed to be patentable over the cited combinations. Accordingly, Applicant respectfully requests withdrawal of the Examiner's rejections and allowance of the foregoing claims.

B. References Do Not Disclose Recycle to the Reactor Without Fractionation

Independent claim 1, as amended, recites "transferring . . . at least a majority of the condensed hydrocarbon fluid . . . to the reaction zone *without fractionating* the condensed hydrocarbon fluid." Similarly, independent claim 25 recites "transferring at least a majority of the hydrocarbon liquid in the recycle zone to the reaction zone *without fractionating* the hydrocarbon liquid." Independent claim 15, as amended, recites "a recycle tank adapted to receive condensed hydrocarbon fluid from the condenser . . . and a pump and at least one conduit . . . adapted to transport the condensed hydrocarbon fluid from the recycled tank to the reactor *without transporting the hydrocarbon liquid through a fractionation system.*" Independent

claim 36, as amended, recites “a recycle tank adapted to receive hydrocarbon liquid from the condenser . . . wherein the fluidic connection between the recycle tank and the reactor *does not include a fractionation column.*”

The Examiner relies on the Howard reference to disclose recycle of a condensed hydrocarbon to the reactor. However, the hydrocarbon condensed in the Howard system is not recycled to the reactor but instead is flashed to provide refrigeration for the Howard condenser. *See* Figures 1-2; col. 5, lines 17-39 Thus, the Howard system does not recycle liquid hydrocarbon to the reactor (with or without fractionation).

Further, the secondary references do nothing to obviate the deficiencies of the Howard reference discussed above. For example, the Kreischer reference *fails* to disclose passing a portion of a recovered condensed hydrocarbon liquid from the reactor effluent back to the reactor or reactor feed system *without* fractionating the hydrocarbon liquid. To be sure, it is clear in the Kreischer system, the *entire* amount of recovered hydrocarbon from the polymerization reactor effluent is sent through a fractionation system. *See* the Kreischer Figure; col. 3, line 22; col. 4, line 19. As for the Perry reference, it does mention that the reactor effluent is flashed in a flash tank 1, but it clearly does not describe condensation of the flash gas or the recycle of a condensed liquid (with or without fractionation). *See* Perry, Figure; col. 2, lines 43-66.

Accordingly, for this reason as well, independent claims 1, 15, 25, and 36, and their dependent claims, are believed to be allowable over the cited combinations. Thus, existing

pending claims 1-3, 5-18, 20-22, 24-41, and 43, as well as new claims 44-48 are believed to be in condition for allowance.

Dependent Claims

In rejecting the various dependent claims, the cited combinations of the Kreischer, Howard, Perry, and Lutz references do not obviate the deficiencies discussed above with regard to the independent claims 1, 15, 25, and 36. Therefore all of the dependent claims are believed to be patentable for the subject matter they separately recite as well as by virtue of their dependency on their respective allowable base claims. Moreover, there is no suggestion or motivation to modify or combine the cited references in the manner asserted by the Examiner or in the manner recited in the claims. Accordingly, Applicant respectfully requests withdrawal of the Examiner's rejections and allowance of the claims.

Conclusion

In view of the remarks and amendments set forth above, Applicant respectfully requests allowance of claims 1-21. If the Examiner believes that a telephonic interview will help speed this application toward issuance, the Examiner is invited to contact the undersigned at the telephone number listed below.

General Authorization for Extensions of Time

In accordance with 37 C.F.R. § 1.136, Applicant hereby provides a general authorization to treat this and any future reply requiring an extension of time as incorporating a request therefor. Furthermore, Applicant authorizes the Commissioner to charge the appropriate fee as



well as any additional fees which may be currently due to the credit card listed on the attached PTO-2038. However, if the PTO-2038 is missing, if the amount listed thereon is insufficient, or if the amount is unable to be charged to the credit card for any other reason, the Commissioner is authorized to charge Deposit Account No. 06-1315; Order No. CPCM:0019/FLE (210331US).

New Claims


Applicants have added new claims 44-47.

Applicants respectfully submit that new claims 44-47 are in condition for allowance.

The Commissioner is authorized to charge the requisite fee of \$88.00 to the attached PTO-2038 for the addition of a new independent claim, and any additional fees which may be required, to Deposit Account No. 06-1315; Order No. CPCM:0019/FLE (210331US).

Respectfully submitted,

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